

REMARKS

Claim 64 has been amended and claims 93-95 have been added. No new matter has been added by virtue of the amendments, support therefore being found throughout the originally filed claims and specification (e.g. page. 15, line 30 – page 16, line 2; page 16, lines 6-10 and 20-25; page 28, lines 5-8; page 28, lines 29-30; page 29, lines 7-9; page 29, lines 16-26; page 29, line 28 – page 30, line 21; page 33, lines 8-11; page 40, lines 9-22).

1. 35 U.S.C. §112 Rejections

Claims 64-68 and 70-92 are rejected under 35 U.S.C. §112, first paragraph. In particular, the Office requests that applicants point out where the language in the last two lines of claim 64 appears.

Applicants respectfully submit that claim 64 has been amended to delete the terminology in question. Reconsideration and withdrawal of the rejection is respectfully requested.

Claims 64-68 and 70-92 are rejected under 35 U.S.C. §112, second paragraph. In particular, the Office states that "It is uncertain where the cytophilic and cytophobic regions are located in relation to the channels or the converse." The Office further asks "where are the channels located with respect to the polymeric surface?"

Applicants respectfully submit that claim 64 has been amended to delete the terminology in question. Reconsideration and withdrawal of the rejection is respectfully requested.

2. 35 U.S.C. §103 Rejections

Claims 64-68 and 70-92 are rejected under 35 U.S.C. §103(a) over Singhvi et al (6,368,838) in view of Dewez et al (WO 96/15223) and Anderson et al (6,686,184).

Applicants respectfully traverse.

Applicants' claim 64 recites a device for adhering a biomolecule in a predetermined position comprising a substrate comprising a polymeric surface and having thereon a plurality of cytophilic regions that can adhere a biomolecule and cytophobic regions to which the biomolecules do not adhere. The cytophobic regions are contiguous with the cytophilic regions. Further, the cytophobic regions comprise one or more surfactant compounds.

Such devices provide a wider range of substrate materials and surface materials on which biomolecules may be adhered and, further, provide cytophobic and cytophilic regions on these wide range of materials without the use of SAMs or plasma discharge treatment.

Singhvi describes a plate having one or more cytophilic islands on its surface. The cytophilic islands include self-assembled monolayers (SAMs). The islands are isolated by cytophobic regions including self-assembled monolayers (SAMs) (see col. 2, line 64 – col. 3, line 3). Singhvi specifies that "The patterns of the present invention are formed by self-assembled monolayers (SAMs)" (col. 4, lines 4-5). Singhvi defines that "plate" as "any object with a surface capable of reacting with a solution including a SAM forming compound such that a SAM is formed on the surface" (col. 7, lines 45-48). Thus, the surface is limited to those on which a SAM may be formed. Further, Singhvi requires that the cytophilic and cytophobic regions are formed by SAMs. According to Singhvi, cells are adhered to the cytophilic regions formed by the SAMs. Singhvi does not teach or suggest cytophobic regions created by surfactants.

The Office, however, relies on Dewez and asserts that

It would have been obvious to provide the cytophilic islands of the device of Singhvi et al with extracellular matrix protein to enhance the binding of cells as suggested by Singhvi et al and Dewez et al, and it would have been obvious to provide the cytophobic regions of Singhvi et al with surfactant to inhibit binding of extracellular matrix protein to these regions as suggested by Dewez et al.

Applicants respectfully disagree.

Singhvi provides a surface having cytophobic and cytophilic regions. These regions are created by SAMs. There is no suggestion or motivation to modify these cytophobic and cytophilic regions with surfactants and proteins to provide what is already present – cytophobic and cytophilic regions.

Applicants provide cytophobic regions by the use of surfactants. Singhvi provides cytophobic and cytophilic regions by the use of SAMs.

Further, Dewez describes a method wherein the surface of a polymeric support is partially covered by a mask, the surface is treated by plasma discharge, the mask is removed, and the thus treated polymeric support is conditioned with surfactant and a protein to form modified areas and non modified areas (see page 6, lines 14-21 of Dewez). According to Dewez, the surface requires plasma treatment prior to conditioning with surfactant and protein. Dewez does not teach or suggest that an untreated surface may be conditioned with surfactant or protein. Singhvi's surfaces are not treated and, thus, one would not expect that the surfaces of Singhvi could be conditioned with surfactant or protein.

Still further, modification of Singhvi as suggested by the Office, still would not provide Applicants' device. Singhvi requires a plate having a surface on which a SAM may be formed. Such surfaces are limited and would not include a substrate comprising a polymeric surface as disclosed by Applicants.

Applicants further note that the formation of SAMs on a surface require the SAMs to be bonded to the substrate, usually by covalent bonding. As such, Singhvi describes a device and method wherein the cytophobic and cytophilic regions are formed using SAMs. According to Applicants' methods, the surfactant compound is not required to be covalently linked to the substrate. This feature is set forth in claim 65. Thus, even if Singhvi could be modified as suggested by the Office so as to provide surfactants on the cytophobic regions, the surfactants would be linked to the substrate via the SAMs.

Accordingly, Applicants respectfully submit that claim 64 is patentable over Singhvi and Dewez. Claims 65-68, 70-80 and 83-94 depend from claim 64 and, likewise, are patentable over Singhvi and Dewez.

Applicants' claim 95 recites a device for adhering a biomolecule in a predetermined position comprising a substrate comprising a polymeric surface and having thereon a plurality of cytophilic regions that can adhere a biomolecule and cytophobic regions to which the biomolecules do not adhere, and microfluidic channels on the polymeric surface. The cytophobic regions are contiguous with the cytophilic regions, and the cytophobic regions comprise one or more surfactant compounds.

Applicants respectfully traverse. As set forth above, claim 64 is patentable over Singhvi and Dewez. Claim 95 recites the elements in claim 64 and adds microfluidic channels on the polymeric surface. These channels allow localized access to the underlying substrate and the regions on the substrate and, thus, more specific attachment to underlying regions of the substrate (see, e.g. page 29, lines 16-26). Further, such channels allow perfusion of different networks with different cell types (see, e.g. page 29, line 28 – page 30, line 8).

Anderson describes methods for patterning surfaces using microfluidic stamps. There is no description or suggestion in Anderson or any of the cited references that such methods may be used on polymeric surfaces having cytophobic and cytophilic regions. This teaching comes purely from Applicants disclosure.

Accordingly, claim 95 is patentable over Singhvi, Dewez and Anderson.


CONCLUSION

In view of the foregoing, applicants request reconsideration and allowance of claims 64-68, 70-80 and 83-95.

It is believed that no fees are required for consideration of this response. However, if for any reason the fee paid is inadequate or credit is owed for any excess fee paid, the Office is hereby authorized and requested to charge Deposit Account No. **04-1105**.

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Respectfully submitted,



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